In the claims:

1. (Previously amended) An apparatus, comprising:

a polished uncoated doped laser rod comprising a first end and a second end and an entire length, wherein said laser rod comprises a tapered diameter along said entire length;

a first flanged endcap operatively connected to said first end; and

a second flanged endcap operatively connected to said second end.

2. (Original) The apparatus of claim 1, wherein said laser rod comprises a maximum diameter at said first end and a minimum diameter at said second end.

3. (Original) The apparatus of claim 1, wherein said laser rod comprises a maximum diameter at said second end and a minimum diameter at said first end.

4. (Original) The apparatus of claim 1, wherein said laser rod comprises a minimum diameter at about half the distance from said first end to said second end.

5. (Original) The apparatus of claim 1, wherein said first flanged endcap and said second flanged endcap are undoped.

6. (Original) The apparatus of claim 1, wherein said laser rod tapers in diameter from a small value of d at one end to a larger value of $d+\varepsilon$ at the other end.

7. (Original) The apparatus of claim 1, wherein said tapered diameter is optimized to a taper value that balances the contradictory requirements of maximizing the size of said taper so as to minimize the longest trapped path length of light rays propagating within said laser rod, and minimizing the size of said taper so as to maximize the fractional volume in said laser rod that is accessible to an extracting laser beam.

8. (Original) The apparatus of claim 1, wherein said tapered diameter continuously continuous changes over the entire length of said laser rod.

9. (Original) The apparatus of claim 1, wherein said laser rod is narrowest between the ends of said laser rod and the diameter increases at each end.

10. (Original) The apparatus of claim 1, wherein said laser rod is narrowest at about half the distance between the ends of said laser rod and the diameter increases as you go towards either end.

11. (Original) The apparatus of claim 10, wherein said tapered diameter is optimized to a taper value that balances the contradictory requirements of maximizing the size of said taper so as to minimize the longest trapped path length of light rays propagating within said laser rod, and minimizing the size of said taper so as to maximize the fractional volume in said laser rod that is accessible to an extracting laser beam.

12. (Currently amended) A solid state laser, comprising:

a uncoated doped laser rod with a first end and a second end and an entire length, wherein said laser rod comprises a tapered diameter along said entire length, wherein said rod is operatively located within a surrounding medium that has a lower index of refraction than said rod;

a first flanged, undoped end-cap optically contacted to said first end portion to form a first interface;

a second flanged, undoped end-cap optically contacted to said second end to form a second interface;

a cooling jacket sealably coupled to said first and second flanged end-caps;

a pump laser for providing pump laser light directed at said first flanged end-cap; and

a lens duct interposed between said pump laser and said first flanged end-cap, wherein said lens duct will concentrate said pump laser light.

13. (Original) The solid state laser of claim 12, wherein said laser rod has a host lattice, and wherein said host lattice and said first and second flanged end-caps are selected from the group consisting of yttrium aluminum garnet, gadolinium gallium garnet, gadolinium scandium gallium garnet, lithium yttrium fluoride, yttrium vanadate, phosphate glass and sapphire.

14. (Original) The solid state laser of claim 13, wherein said host lattice is doped with a material selected from the group consisting of Ti, Cu, Co, Ni, Cr, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm and Yb.

15. (Original) The solid state laser of claim 12, wherein said laser rod comprises Yb.sup.3+ doped YAG, and wherein said pump laser is an InGaAs diode laser array.

16. (Currently amended) A method for fabricating a laser rod, comprising:

providing a polished uncoated doped laser rod comprising a first end and a second end and an entire length;

operatively locating said rod within a surrounding medium that has a lower index of refraction than said rod

operatively connecting a first flanged endcap to said first end;

operatively connecting a second flanged endcap to said second end; and

tapering the diameter of said laser rod along said entire length.

17. (Original) The method of claim 16, wherein the step of tapering the diameter of said laser rod comprises forming a maximum diameter at said first end and a minimum diameter at said second end.

18. (Original) The method of claim 16, wherein the step of tapering the diameter of said laser rod comprises forming a maximum diameter at said second end and a minimum diameter at said first end.

19. (Original) The method of claim 16, the step of tapering the diameter of said laser rod comprises forming a minimum diameter at about half the distance from said first end to said second end.

20. (Original) The method of claim 16, further comprising optimizing the diameter of said laser rod to a taper value that balances the contradictory requirements of maximizing the size of said taper so as to minimize the longest trapped path length of light rays propagating within said laser rod, and minimizing the size of said taper so as to maximize the fractional volume in said laser rod that is accessible to an extracting laser beam.